

What is claimed is:

1. A drill pipe with enhanced strength and fluid flow capability, the drill pipe comprising:

an elongate pipe section having a central axis, a substantially uniform pipe outer diameter, P_{OD} , along its axial length, and a substantially uniform pipe inner diameter, P_{ID} , along its axial length;

5 a pin tool joint at an axial end of the pipe section, the pin tool joint having external pin threads and a pin shoulder;

10 a box tool joint at an axial end of the pipe section opposing the pin tool joint, the box tool joint having internal box threads for mating engagement with the external pin threads of a mating drill pipe and a box shoulder for engagement with the pin shoulder of the mating drill pipe;

15 the pin tool joint and the box tool joint each having a substantially uniform tool joint outer diameter, TJ_{OD} , along its axial length and a substantially uniform tool joint inner diameter, TJ_{ID} , along its axially length; and

the drill pipe having a ratio, R , expressed as:

$$8.8 \geq \frac{P_{ID} + TJ_{ID}}{TJ_{OD} - P_{OD}} \geq 8.0$$

20 2. The drill pipe as defined in Claim 1, wherein R is from 8.1 to 8.5.

3. The drill pipe as defined in Claim 2, wherein R is from 8.2 to 8.4.

25 4. The drill pipe as defined in Claim 1, wherein the pipe section outer diameter, P_{OD} , is from 5 $\frac{3}{4}$ inches to 6 inches.

5. The drill pipe as defined in Claim 1, wherein the tool joint outer diameter, TJ_{OD} , is less than or equal to 7 inches.

6. The drill pipe as defined in Claim 1, wherein the tool joint inner diameter, TJ_{ID} , is greater than or equal to 4 inches.

7. The drill pipe as defined in Claim 6, wherein the tool joint inner diameter, TJ_{ID} , is less than or equal to $4 \frac{1}{4}$ inches.

8. The drill pipe as defined in Claim 1, wherein the pin tool joint internal thread and the box tool joint external thread are each tapered.

10 9. The drill pipe as defined in Claim 1, when the pin tool joint and the box tool joint are each welded to the pipe.

10. The drill pipe as defined in Claim 1, further comprising:
another pin shoulder on the pin tool joint;
15 another box shoulder on the box tool joint; and
the another pin shoulder mates with the another box shoulder of the mating drill pipe.

11. A drill pipe with enhanced strength and fluid flow capability, the drill
20 pipe comprising:

an elongate pipe section having a central axis, a substantially uniform pipe outer diameter, P_{OD} , of from $5 \frac{3}{4}$ inches to 6 inches along its axial length, and a substantially uniform pipe inner diameter, P_{ID} , along its axial length;

25 a pin tool joint connected by welding to an axial end of the pipe section, the pin tool joint having external pin threads and a pin shoulder;

a box tool joint connected by welding to an axial end of the pipe section opposing the pin tool joint, the box tool joint having internal box threads for mating engagement with the external pin threads of a mating drill pipe and a box shoulder for engagement with the pin shoulder of the mating drill pipe;

the pin tool joint and the box tool joint each having a substantially uniform tool joint outer diameter, TJ_{OD} , less than or equal to 7 inches along its axial length and a substantially uniform tool joint inner diameter, TJ_{ID} , of at least 4 inches along its axially length; and

5 the drill pipe having a ratio, R, expressed as:

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$$8.8 \geq \frac{P_{ID} + TJ_{ID}}{TJ_{OD} - P_{OD}} \geq 8.0$$

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12. The drill pipe as defined in Claim 11, wherein R is from 8.1 to 8.5.

13. The drill pipe as defined in Claim 11, wherein the tool joint inner diameter, TJ_{ID} , is less than or equal to 4 $\frac{1}{4}$ inches.

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14. The drill pipe as defined in Claim 11, wherein the pin tool joint internal thread and the box tool joint external thread are each tapered.

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15. The drill pipe as defined in Claim 11, further comprising:
another pin shoulder on the pin tool joint;
another box shoulder on the box tool joint; and
the another pin shoulder mates with the another box shoulder of the mating drill pipe.

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16. A drill pipe with enhanced strength and fluid flow capability, the drill pipe comprising:

an elongate pipe section having a central axis, a substantially uniform pipe outer diameter, P_{OD} , along its axial length, and a substantially uniform pipe inner diameter, P_{ID} , along its axial length;

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a pin tool joint connected by welding to an axial end of the pipe section, the pin tool joint having external pin threads and first and second axially spaced pin shoulders;

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a box tool joint connected by welding to an axial end of the pipe section opposing the pin tool joint, the box tool joint having internal box threads for mating engagement with the external pin threads of a mating drill pipe and first and second axially spaced box shoulders each for engagement with a respective pin shoulder of the 5 mating drill pipe;

the pin tool joint and the box tool joint each having a substantially uniform tool joint outer diameter, TJ_{OD} , less than or equal to 7 inches along its axial length and a substantially uniform tool joint inner diameter, TJ_{ID} , along its axial length;

10 the elongate pipe section having an internal upset region at each axial end thereof, each upset region having an enhanced wall thickness and an internal upset diameter approximating the tool joint inner diameter, TJ_{ID} ; and

the drill pipe having a ratio, R, expressed as:

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$$8.8 \geq \frac{P_{ID} + TJ_{ID}}{TJ_{OD} - P_{OD}} \geq 8.0$$

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17. The drill pipe as defined in Claim 16, wherein R is from 8.1 to 8.5.

18. The drill pipe as defined in Claim 16, wherein the pipe section outer diameter, P_{OD} , is from $5\frac{3}{4}$ inches to 6 inches.

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19. The drill pipe as defined in Claim 16, wherein the tool joint inner diameter, TJ_{ID} , is greater than or equal to 4 inches and is less than or equal to $4\frac{1}{4}$ inches.

20. The drill pipe as defined in Claim 16, wherein the pin tool joint internal thread and the box tool joint external thread are each tapered.

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